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ABSTRACT

As a medium for delivering lifelong learning, the Internet makes it possible to customize education to individual needs, deliver education anywhere and anytime, and enable learners to interact with other learners and teachers collaboratively to solve problems and learn new skills. Nevertheless, as a medium for delivering lifelong learning, the Internet is still fraught with the following problems: (1) learning not tailored to meet individual learners' needs in a culturally specific manner may be ineffective; (2) because English is the predominant language of the Internet, many learners who are not native English speakers cannot make full use of the Internet; and (3) learning materials may need to be redesigned for the online environment. A group of New Zealand educators who have offered education via the Internet since 1995 and who now have major mirror sites in Belgium, Brazil, Finland, Canada, and South Africa, offer the following lessons to educators seeking to embrace lifelong learning on the Internet: (1) interaction is a key ingredient in the learning process; (2) providing feedback is an essential element of learning on the Internet; (3) offer courses in learners' native languages; (4) abandon the concepts of copyright and ownership; and (5) when designing courses, seek a balance between investment and change by designing courses for obsolescence. (Contains 37 references.) (MN)

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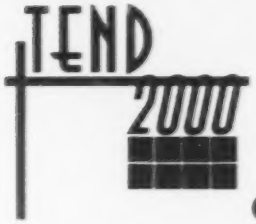

Crossroads of the New Millennium

Lifelong Learning On The Web

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Workshop 1

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Abstract

Education has increasingly become a lifelong process. The change from an industrial based society to an information-based society requires new skills and frequent retraining. The Internet is becoming a popular medium in which delivery of education is taking place.

Using the Internet to deliver lifelong learning offers many advantages. Customised learning that is tailored to individual needs, and anytime anywhere delivery is possible. Learners have the possibility of interacting with other learners and teachers in new interaction patterns, working collaboratively to solve problems and learn new skills.

Yet, as much as the Internet offers new ways of learning, there are many problems that remain to be addressed. Unless the delivery of education is tailored to individual learner needs and is culturally specific, learning may not be effective. The predominant language of the Internet is English, and may restrict learners in a global world to a language that is not their native tongue. Learning material may need to be redesigned for the on-line environment.

The author outlines a strategy for addressing these issues based on his own experiences at delivering content on a global scale. Drawing on the experiences and lessons learnt from the author's own global web-site on lifelong learning, critical design issues for delivering content to a global marketplace of learners are discussed. If the citizens of our global society are to benefit from lifelong learning on the Internet, many issues will need addressing, such as access, language and culture, copyright and co-operation.

Lifelong Learning On The Web

INTRODUCTION

This century will probably be most remembered for the rate of technological change. We have seen the advent of air, sea, land and space travel. Just when people marvelled at the quickness of the pony express and its ability to deliver mail from one side of a vast country to another, it was made obsolete by the technology of the telegraph and steam train in less than two years.

Just as a new and faster model replaced the model of the pony express, the pace of technological change has affected all aspects of our industrial based society. We have at our disposal smart appliances and intelligent cars. Yet, for all this technology, there appears to be something wrong. We don't have a smart education system producing smart people for a smart world.

Perhaps it is the rate of technological change. Whatever the cause, retraining of citizens has become a national pastime for the majority of nations. Al Gore, Vice President of the United States of America, in an address to the CAEL Joint National Conference in 1997, spoke of the need for people to retrain.

> *"For example, a good job in a high-growth field almost certainly demands an understanding of information technology. That fact - coupled with ever-accelerating advances in technology - means that the vast majority of workers need to constantly learn new skills to have a strong future. The Commission for a Nation of Lifelong Learners pointed out in its report that over the next decade, 75% of the current workforce will need significant retraining".*

Gore reveals that lifelong learning is considered a top priority by the US government, which established a national commission responsible for this area of education. The US government has supported the national commission for lifelong learning by passing legislation, so that *"Americans of any age can now receive a lifetime learning tax credit of 20% of all educational costs up to $5,000 a year"* (Gore, 1997). Gore's view that the majority of workers will need

retraining is supported by Dordick (1987, p142), who asserts that *"the era of the single career in a life-time is rapidly disappearing"* and that *"post employment training of education (..) is fast becoming as large an industry as formal education"*.

Professor John Field, professor of Life Long Learning at the University of Warwick, commenting upon recent initiatives of the UK government, suggests that

> *"Life Long Learning, to judge by recent policy pronouncements, is the new global orthodoxy. No one seems to believe any more that we can thrive for a lifetime on the basis of a single, early injection of education".*

So what do we mean by the term "lifelong learning"?

WHAT IS LIFELONG LEARNING?

The Merriam-Webster on-line dictionary defines the word "lifelong" as "lasting or continuing through life". In their book *"Lifelong Learning: The Essential Guide"*, English and Seath (1998) highlighted the diverse range of definitions available for "lifelong learning", and generated their own definition.

> *"Lifelong learning is about individuals, organisations and communities learning in new and transformational ways, achieving the high level of skills, knowledge and flexibility to operate effectively in the 21st century".*

In looking at distance education models, Sherry (1996) identified a number of characteristics common in this type of learning.

- separation of teacher and learner in space and/or time
- volitional control of learning by the student rather than the distant instructor
- non-contiguous communication between student and teacher
- communications mediated by print or some form of technology

Lifelong learning is being mediated by the Internet, providing flexibility and effectiveness of delivery to distance students around the globe. This connects teachers and learners in new ways.

Why do we want to provide lifelong learning opportunities via the Internet? There are a number of reasons, one of which was provided by South African Education Minister Sibusiso Bengu (1996) who stated in a white paper (15 March, 1995) on education:

> *"Our message is that education and training must change. It cannot be business as usual in our schools, colleges, technikons and universities."*

Another possible reason to provide educational learning opportunities via the Internet is the perception some researchers have of the changing needs of learners. For example, Bridwell, Bertz, DeVries and White (1996) highlight the changing needs and roles of learners, educators, and institutions. According to Edwards (1995), the global consumer is demanding courses that are flexible, adaptable, portable and interactive. The Internet appears capable of providing these types of courses, a view supported by Thorvaldsen (1980, p. 8).

> *"The world communications net, the all-involved linkage of electric circuitry, will grow and become more sensitive. It will also develop new modes of feedback so that communications can become dialogue instead of monologue. It will breach the wall between "in" and "out" of school. It will join people everywhere".*

We live in changing times and thus educational requirements are changing. Education throughout one's lifetime is now a necessity, and the Internet has a role to play in education.

THE ADVANTAGES OF LEARNING ON THE WEB

The Internet makes possible a greater range of learning and teaching activities (Harris, 1998). According to Resnick (1996),

> *"The Internet acts as a type of Rorschach test for educational philosophy. When some people look at the Internet, they see it as a new way to deliver instruction.*

> *When other people look at it, they see a huge database for learners to explore. When I look at the Internet, I see a new medium for construction, a new opportunity for learners to discuss, share, and collaborate on constructions".*

Collaboration of learners working on group projects and shared knowledge appears to be a common advantage listed by many researchers. For example, Bracewell, Breuleux, Laferrière, Benoit and Abdous (1998) suggest that

> *"In connected classrooms (whether this connection is local or remote), new interaction patterns are born. Resources for learning expand beyond the teacher and textbook".*

Increased collaboration amongst students (as an example of a new interaction pattern) appears to be an advantage of Internet based learning. Other researchers (Ahola-Sidaway and McKinnon, 1998) suggest that collaboration amongst educators and educational providers is another advantage, with joint development and delivery of educational content becoming more common. Hall (1995) expresses the opinion that it *"will multiply the capacity for students to review and master knowledge through self-paced, interactive study".*

Some researchers have focused on the ability of the Internet to create a global multi-cultural classroom. Bates (1996) asserts that *"new technologies offer the promise of a global classroom of students who can access teachers from anywhere in the world, and be able to participate in virtual classrooms with students from many nationalities and locations".*

According to Harding and Ziebarth (1995), *"anything on the web becomes material for shared real-time presentation and discussion in the classroom".* As more and more classes use the Internet, the information available from these classes has the potential to be reused by others.

The nature of courses will change, becoming more modular and *"personalised to match learner needs"* (Laurillard, 1994). According to Rajasingham (1996), learners will be able to select from universities that *"will provide smorgasbords of courses that are up to date and related to the new developments and new subjects".* This seems to reflect a change to a more

market driven economy, with educational providers becoming more responsive to learner needs, a view shared by Cambell (1997), who asserts that *"the universities of the future who listen to their students will be able to adjust to a consumer driven global system of teaching and learning"*.

Using the Internet to deliver lifelong education has the potential to free learners from *"both the synchrony of time and of place that has characterised learning to date"* (Gomory, 1996). This freedom opens up the possibility of rich learning environments, that, according to Grabinger (1996, p.668) are *"much more comprehensive and holistic than individual computer applications"*. New technology has the potential to enable two-way dynamic interaction between learners and teachers, a marked change from the traditional distance education model that relied upon static interaction with material delivered using a one-way model of communication (Karaliotas, 1998).

The Information Technology Advisory Group (ITAG, 1996) indicated in their report to the New Zealand government that, in the near future, *"learners will switch between a virtual class and a real class"*. However, the implication is that the physical class will still exist, a view supported by Boettcher (1999) who suggests *"the shift from the classroom to the Web does not mean that the classroom goes away"*. Learners may end up learning in both real classrooms and virtual ones, a view supported by Tiffin and Rajasingham (1995).

One issue concerning technology-mediated learning is whether students can learn effectively within such an environment. Wilbur Schramm (1997, p.28) in a study of television versus classroom instruction reported the finding that there was *"no significant difference"* in student learning. However, many researchers are beginning to focus on what they perceive as the advantages of technology-mediated learning. For example, Laszlo and Castro (1995) reported that students become totally absorbed in task engagement when an interactive learning environment exists. They concluded that *"tools used in Web-based learning have the potential to move students onto higher order thinking where they would be the entrepreneurs of learning - creating new information as opposed to simply digesting and storing information for later use in life"*.

This is further supported by Hollenbeck (1998), who states that *"the Internet-driven curriculum is seen as a place for students to create meaningful knowledge on their own, using an environment full of experts waiting to be interviewed and vast amounts of information ready to be mined"*. These researchers suggest that the Internet environment may help with the construction of learner knowledge, either on their own, or with their peers.

In summary, some advantages of using the Internet for lifelong learning are:

- a greater range of teaching and learning activities are possible
- greater collaboration amongst learners and teachers
- cultural diversity
- personalised instruction
- any time, anywhere instruction
- higher level skills and cognitive thinking

Is this the whole picture? Some researchers are urging caution, and I will give examples of this in the next section. It is time to look at the other side of the argument.

THE PROBLEMS OF LEARNING ON THE WEB

Many researchers are beginning to highlight potential problems with the use of the Internet for the delivery of education. For example, the Commonwealth of Australia (1995, p. 61) found that *"in remote locations indigenous peoples find it difficult to sustain the conditions necessary for independent study without specific support and a curriculum tailored to their needs"*. This seems to suggest that learning may be culturally based, and that tailoring of education into the context of culture may be a necessary ingredient for success.

One of the problems that Schegel (1996) points out is the size of Internet, asserting that the *"amount of information can become so sheer as to be overwhelming and perhaps, ultimately, discouraging"*. Other researchers such as Horn (1989, p. 220) recommend the breaking of information into smaller manageable quantities.

One area of current research is that on-line students may require different skills than their classroom counterparts. According to Hardy and Boaz (1997), *"prospective students need to*

know that a distance course requires self-discipline, self-motivation, the ability to work independently, and perseverance". Sanford and Richardson (1997) highlight the necessity for on-line students to develop adequate computer and Internet skills as a requirement for web-based learning.

Another issue appears to be the way courses are structured on the Internet. There has been a tendency to scan information from textbooks and make these available digitally, which, according to Micheal Hannafin (cited by Axelson & Hardy, 1996), means, *"we haven't accomplished much".* This failure to effectively integrate technology into the learning process and simply use it as an add-on to existing curriculum is reported in research by Bailey, Ross and Griffin (1996).

The instructional design of on-line courses is an issue raised by Jane Conoley (1999). She asserts *"without the other two components [development of new pedagogies and technological application to existing and emerging learning theory], however, distance education will not take its place as a new teaching approach. It will remain only a delivery system".* According to Sanford and Richardson (1997) a constructivist approach is necessary in web-based learning because *"students are forced to access, retrieve, reconstruct, adapt, and organise information in a way that is meaningful to their learning".*

Roxanne Starr (1995) conducted research into the development of a virtual classroom. According to her findings, *"lecture type materials are boring. To maintain interest, the instructor should use written language in a skillful way, orchestrate active participation by the students, and stimulate collaborative assignments that involve both social and task-orienated activities".* In addition, Starr raises the question of teacher-learner interaction and highlights the frustration experienced by learners due to the lack of an immediate response from the teacher. This issue of synchronous communications in the virtual classroom is mentioned by Sherry (1996), who asserts *"without connectivity, distance education degenerates into the old correspondence course model of independent study".*

In summary, some disadvantages of using the Internet for lifelong learning are:

- learning is cultural dependent

- information must be presented as meaningful for the learner
- learners may suffer from information overload
- the skills required for on-line learners differ from conventional classroom learners
- instructional design of on-line courses is an important factor
- synchronous communication with teachers is necessary to maintain student motivation

I have looked at some of the issues associated with lifelong learning on the Internet. Now it is time to discuss some of the findings from my own project that has been involved in the delivery of self-learning courses via the Internet.

OUR PROJECT: LIFELONG LEARNING ON THE WORLD WIDE WEB

In late 1994, I began looking at the use of sharing information from a centralised server. This information was mainly course notes, copies of assessments and reading material for students. Students could access this information from the computer labs as required. In effect, distance between my students and myself was reduced, the time element of accessing notes altered, thus creating our own little village.

In 1995, the files and documents were converted from Microsoft Write format to HTML and placed on the web server. We started with a module of the New Zealand National Certificate in Business Computing called Data Communications. The full set of notes, sample tests, previous examination papers and suggested answers were placed on-line. At that time our entire server was indexed nightly and integrated into an ARCHIE database.

Literally overnight we became known globally. Within a week more people outside the organisation accessed the material than those within it. Since then we have added more self-paced learning modules. Our site at CIT gets about a million hits a week from in excess of 25,000 visitors. We now have five major mirror sites worldwide (Belgium, Brazil, Finland, Canada, South Africa) and numerous others for individual modules. The material is used at 123 universities around the world, a number of organisations such as Sun, Microsoft, Nasa, US naval intelligence, Motorola and many others.

In June, 1999, the web site won the Global Bangemann trophy for the category "Lifelong learning" and I travelled to Stockholm, Sweden, to collect the trophy from the King of Sweden in the Nobel hall. Life-long learning, especially formatted as self-paced learning modules delivered via the Internet, is a popular and untapped market. We live in a world with a rapidly aging population. The skills required of workers are changing and the rapid rate of technological change causes workers to reinvest in training many times within their working career.

Self-directed learners want to be able to access information quickly and in a form that's easy to read. They want that information available at a time and place of their choosing and to be assured that the information is reliable and up-to-date. The self-directed learner is not the result of technological change. From birth we are all self-directed learners, adapting and reacting to the world in which we live. Somehow we seem to loose that ability when we enter the education system.

Life-long learning has become a reality for us all. Our educational institutions have been geared to present education to a small group of individuals for a limited time. They enter our doors, stay a year or two and then enter the work force. It is called tertiary education. But that is not the model of the real world. It is the model of the industrial world, one in which we have one foot in. It is a dying world. Our other foot is in the information world. And it is that world which is becoming the dominant one.

This new information world changes everything. We do not have the bricks and mortar to build new campuses. We have run out of physical building space and it is too costly to increase the number of students on campus. Our population is aging, and our major growth rate is not in school leavers, but in adult education.

Education is not just about buildings and it's not just about school leavers. The greatest market is the adult worker. Yet, mainstream educational organisations continue on with the industrial model of providing the wrong types of skills, using the wrong types of buildings, to the wrong types of students.

For example, we do not have to go to a movie theatre to watch a movie. We do not have to go to the news stand to get the latest news. We do not need a radio to listen to music. And we do not have to physically go to universities and polytechnics to learn. Just as the walkman revolutionised the delivery of music to people, so too the Internet can deliver education to people on the move, to when and where they want it.

Our lifelong learning site provides education at a time and location that suits the learner, 24 hours a day, seven days a week, 365 days a year. Its doors are never closed. People today are busier than ever. Many adult learners must retrain whilst on the job. Many employers won't pay for retraining. This availability satisfies a worldwide demand.

It is a microcosm of a model that we should all be using. For education is not about buildings and learning 8-5 Monday to Friday. Education is about infrastructures, transport systems and classrooms, where teachers, students, knowledge and problems meet. In this new information society, the transport systems are not buses, cars and trains, but networks and the Internet. The technologies are not chalk and books, but e-mail, video conferencing, list servers, chat rooms and the Web. At its core these new structures are technology based.

What are some of the lessons we have learnt from this global delivery of self-paced learning? That's a good question.

LESSON 1: INTERACTION

Learning requires more than just reading. Interaction is a key ingredient of the learning process. To reinforce learning concepts, learners should apply what they have learnt. Traditional web sites implement this using interactive tests or assignments. Yet there are other ways to support interaction. The use of both asynchronous and synchronous mechanisms should be considered.

Asynchronous mechanisms are e-mail, list servers, and discussion lists. Answers are not immediate, thus learners can find these modes of interaction slow and frustrating. Synchronous mechanisms are real-time chat, video-conferencing and real-time tests. These

provide immediate communication and responses, allowing learners to quickly progress through difficulties in their learning experience.

We consider that interaction is an essential component of on-line learning. Without this connection, many learners feel isolated and unable to progress further when problems in their learning are encountered. In our experience, provision of multiple communication mechanisms (both asynchronous and synchronous) is a necessity for effective on-line learning.

Interaction with teachers and learners helps to create a sense of cultural identity and belonging. Without interaction, it is too easy for the on-line learner to become discouraged and abandon their learning. In addition, the networking of learners' online facilitates new modes of communication. Dyadic as well as group communication amongst learners becomes increasingly possible in the on-line environment, especially when facilitated by the use of synchronous technologies.

LESSON 2: FEEDBACK

Providing feedback is an essential element of learning on the Internet. When you develop online courses and share these with others, not only do you get the collective wisdom from other educators around the world, you also receive feedback from global users. This is essential for designing courses that are accessible globally.

Feedback from others may reveal many weaknesses that you might not have considered. Users will be able to identify errors and problems in your courses. Even companies like Microsoft are aware of the benefits of global testing with beta products. If the adage is true that two heads are better than one, then a thousand users on the Internet is worth a whole team of instructional designers. The development of material is thus an iterative process of refinement based on feedback from a global network of peers and learners.

Elements that have been identified for us by learners are the use of language, terminology, sequencing of material, navigational issues and accessibility. By accessibility I mean the ability of sight-impaired learners to read and comprehend the online material. Suggestions are incorporated into the next revisions of each module, leading to a cyclic process of revision and feedback.

LESSON 3: LANGUAGE AND CULTURE

The language of the Internet is predominately English. As more and more global users connect, this poses a problem for the global delivery of education. Courses should be available in the native language of the learner. This is not just a translation of words, but of ideas and symbols. Semiotics is an important issue in global learning.

We have found the best way is to give the courses to others around the world free of charge. They then become responsible for the course translation. In effect they take ownership and customise the course for their own, and their student needs. We have had courses translated into Slovenian, Portuguese, French and Spanish.

LESSON 4: COPYRIGHT AND OWNERSHIP

The issues of ownership and copyright coincided with the rise of the printing press and industrial age. However, the Internet makes possible the easy transfer and copying of information. This raises questions about what you can control and own in the digital world. Our solution was not to try to own it or protect it. Even though there are disclaimers and copyright statements on our work, these really are not an effective mechanism of control.

So we learnt to give information to others. Sometimes we are so protective of the information we have that we don't share it. That's because in our new information world, information is power. But if we are to empower others, we have to share what we have. And the benefit to the global community is obvious. Without this sharing, others cannot take the information and recode it culturally in their own language.

LESSON 5: CO-OPERATION AND THROWAWAY DESIGN

Designing courses for the online environment is a huge investment for most organisations. Yet, there must be a balance between investment and change. Organisations should design for obsolescence. The investment should take into account that the average life of an on-line course is only a few years at best, before it is redesigned, rehashed and significantly altered.

This shift in paradigm from building courses to building links is an important one. There is much good stuff already out there on the Internet. We need to share more and co-operate more as educators. This means letting others use your material and connecting that material with others in new ways to generate new courses.

It is costly to develop material and continually refine it. Using the Internet, we can quickly construct a new course from existing material already available. Educators and providers around the world should cooperate more to make this information more readily available so that all learners from all countries can benefit.

CONCLUSIONS

The lessons we have learnt from our own lifelong learning site are applicable to educational providers and educators alike. We suggest a new paradigm is necessary in the new millennium. This paradigm is based on co-operation, sharing and joint development of teaching material used in the online environment.

How do we proceed in the new millennium? Changes not only need to occur at the organisational level, but also at the teaching level. We proceed by encouraging educators to make their material more readily available and encourage others to work with them in translating it to other languages. This will be facilitated by free access and a willingness to share material. The benefits of this are better resources for learners. As a result, large repositories of courses will become available online for educators to access and reuse.

Communication amongst online educators and learners will be increasingly facilitated by synchronous communications. This will create new networks of interaction and facilitate new modes of learning by inquiry. E-mail, list servers, and discussion groups will complement synchronous forms of communication.

Online learners will increasingly have more input into what, how and when they learn. Educators will construct courses using fragments of those that already exist on the Internet. This montage of links will facilitate just-in-time course construction and allow educators to personalise learning for each student. The design of courses will change, with more emphasis being placed on instructional design for obsolescence.

If we are to embrace the paradigm of the Internet, we also need to abandon the paradigms of the industrial age. Our concepts of copyright and ownership must change to reflect the new environment in which we increasingly find ourselves immersed.

Once again, we repeat the comments of the South African Education Minister Sibusiso Bengu (1996) who stated in a white paper (15 March, 1995) on education:

> *"Our message is that education and training must change. It cannot be business as usual in our schools, colleges, technikons and universities."*

To embrace lifelong learning on the Internet requires us to abandon industrial age models and concepts of ownership, authority and delivery. We must begin to let learners control and direct their own learning experience. We must encompass that learning in a cultural environment that has relevance for them. And finally, we must cooperate more together as educators, exchanging material and lessons so that all citizens of the global world can benefit.

REFERENCES

- Ahola-Sidaway, J., & McKinnon, M. (1998). *Ten principles that foster pedagogical soundness of multimedia learning materials.* Report submitted to Learning Materials Working Group, Department of Canadian Heritage, Ottawa, Canada.
- Axelson, Mary., & Hardy, L. (1996). *Learning on-line: As web-based curriculum grows, are textbooks obsolete*. Electronic School On-Line Journal. Retrieved 30 July, 1999 from the World Wide Web. http://Electronic-school.com/199906/0699f1.html
- Bailey, G., Ross, T., & Griffin, Sr., D. L. (1996). *Barriers to curriculum - technology integration in education*. Educational Considerations, 23(2). 14-17.
- Bates, A. (1996). *The information society: From potential to reality*. Retrieved 1October, 1999, from the World Wide Web. http://avc.uc.ie/ellis/abstracts/batesDrT.htm
- Bengu, S. (1996). Quoted in West, P. (1996). *Online Education in Southern Africa*. Paper presented at the Universities in the 21st Century Conference, Singapore, August 1996. Retrieved 7th August 1999 from the World Wide Web http://pgw.org/pw/21st-conf.html

- Boettcher, Judith. (1999). *Pedagogy and Learning Strategies.* Retrieved 30 July, 1999, from the World Wide Web. http://www.csus.edu/pedtech/Learning.html
- Bracewell, R., & Breuleux, A., & Laferrière, T., & Benoit, J., & Abdous, M. (1998). *The emerging contribution of online resources and tools to classroom learning and teaching.* Retrieved 7th August 1999 from the World Wide Web. http://www.tact.fse.ulaval.ca/ang/html/review98.html
- Bridwell, C., & Bretz, R., & DeVries, H., & White, B. (1996). *Instructional Design for Distance Education.* Communicators Handbook: Tools, techniques and technology (3rd Ed). Maupin House.
- Cambell, N. (1997). *Online learning for pre-service teachers.* Computers in New Zealand Schools. Vol 9. Pp21-24
- Commonwealth of Australia. (1995). National review of education for Aborginal and Torres Strait Islander peoples. Final Report, ACT. Canberra. Australian Government Printing Office.
- Conoley, Jane. (1999). Distance education: Special challenges to instructional excellence. Retrieved 7 August, 1999, from the World Wide Web. http://www.coe.tamu.edu/~distance/jconoley.html
- Dordick, H. 1987. *Information Technology and Economic Growth in New Zealand.* Wellington. Victoria University Press.
- Edwards, R. (1995). *Different discourse, discourses of differents: Globalisation, distance education and open learning.* Distance Education, Vol 16 (2).
- English, H., & Seath, I. (1998). *Lifelong Learning: The Essential Guide.* Somerset TEC and TQMI.
- Field, J. (1999). Opening address to the Association of University Administrators Annual Conference, March 29th 1999. Professor of Lifelong learning at the University of Warwick. Retrieved 7 August, 1999, from the World Wide Web. http://www.csv.warwick.ac.uk/news/pr/education/132
- Gomory, R. (1996). *Learning outside the classroom - The time is now.* Keynote address delivered at the Second International Asynchronous Learning Network Conference. Retrieved 7 August, 1999, from the World Wide Web. http://jrbnt.vuse.vanderbilt.edu/alncnf96/keynote.htm

- Gore, A. (1997). Address to the CAEL Joint National Conference. Retrieved 1st October 1999 from the World Wide Web. http://www.cael.org/confwork/algore.html
- Grabinger, R. S. (1996). Rich environments for active learning. In D. H. Jonassen (Ed.), *Handbook of research for educational communications and technology* (pp. 665-692). New York: Macmillan.
- Hall, J. (1995). *The Revolution in Electronic Technology And The Modern University.* Educom Review. Vol 30. No 4. Retrieved 18th August 1999 from the World Wide Web. http://www.educause.edu/pub/er/review/reviewarticles/30442.html
- Harding, J., & Ziebarth, J. (1995). *Digital technology and the impact on education.* Retrieved 1 October, 1999, from the World Wide Web. http://inet.edu.gov/~gsolomon/hardin.html
- Hardy, D., & Boaz, M. (1997). *Learner Development: Beyond the Technology.* New Directions for Teaching and Learning, #71, Jossey-Bass Publications.
- Harris, J. (1998). *Virtual architecture: Designing and directing curriculum-based telecomputing.* Eugene, OR: ISTE Publications.
- Hollenbeck, J. (1998). Democracy and computer conferencing. *Theory into Practice, 37* (1), 38-45.
- Horn, R. (1989). *Mapping Hypertext: The analysis, organisation and display of knowledge for the next generation of on-line text and graphics.* Lexington MA. Lexington Institute.
- Information Technology Advisory Group. (1998). *Impact 2001. How IT will change New Zealand.* Retrieved 10th August 1999 from the World Wide Web. http://www.moc.govt.nz/pbt/infotech/impact/impact.html
- Karaliotas, Y. (1998). *Interactivity in the Learning Environment: Distance Education.* Retrieved August 9th 1999 from the World Wide Web. http://users.otenet.gr/~kar1125/iaction.htm
- Laszlo, A., & Castro, K. (1995). *Technology and values: Interactive learning environments for future generations.* Educational Technology, 35(2). 7-12.
- Laurillard, D. (1994). *Rethinking University Teaching: A framework for the effective use of education technology.* NY. Routledge.
- Rajasingham, L. (1996). *In search of the virtual class: Education in an information society.* Paper presented at Life-Long learning for the information society conference, Genoa, Italy, 24-28 March, 1996.

- Resnick, M. (1996). *Distributed Constructionism* - Proceedings of the International Conference on the Learning Sciences Association for the Advancement of Computing in Education, Northwestern University, July 1996. Retrieved 1st October 1999 from the World Wide Web. http://el.www.media.mit.edu/groups/el/Papers/mres/Distrib-Construc/Distrib-Construc.html
- Sanford, S., & Richardson, K. (1997). *Interactive Instructional Design: Old Paradigms for New Technologies.* Retrieved 30 July, 1999, from the World Wide Web http://star.ucc.nau.edu/~nauweb97/papers/sanford.html
- Schegel, K. (1996). *Why the Web?* Retrieved 30th July 1999 from the World Wide Web. http://Netspot.city.unisa.edu.au/netspot/eduweb/Theory/WhyWeb/~whyweb.htm
- Schramm, W. (1997). *Big Media, Little Media: Tools and technologies for instruction.* Beverly Hills, CA. Sage.
- Sherry, L. (1996). *Issues in distance learning.* International journal of educational telecommunications, Vol 1, No4. 337-365
- Starr, Roxanne. (1994). *The Virtual Classroom: Learning Without Limits via Computer Networks*. Norwood, New Jersey. Ablex Publishing Corporation.
- Thorvaldsen, P. (1980). (Ed). *From books to bytes: The impact of technology on education*. Toronto, Canada. TV Ontario.
- Tiffin, J., & Rajasingham, L. (1995). *In search of the virtual class: Education in an information society*. London. Routledge.